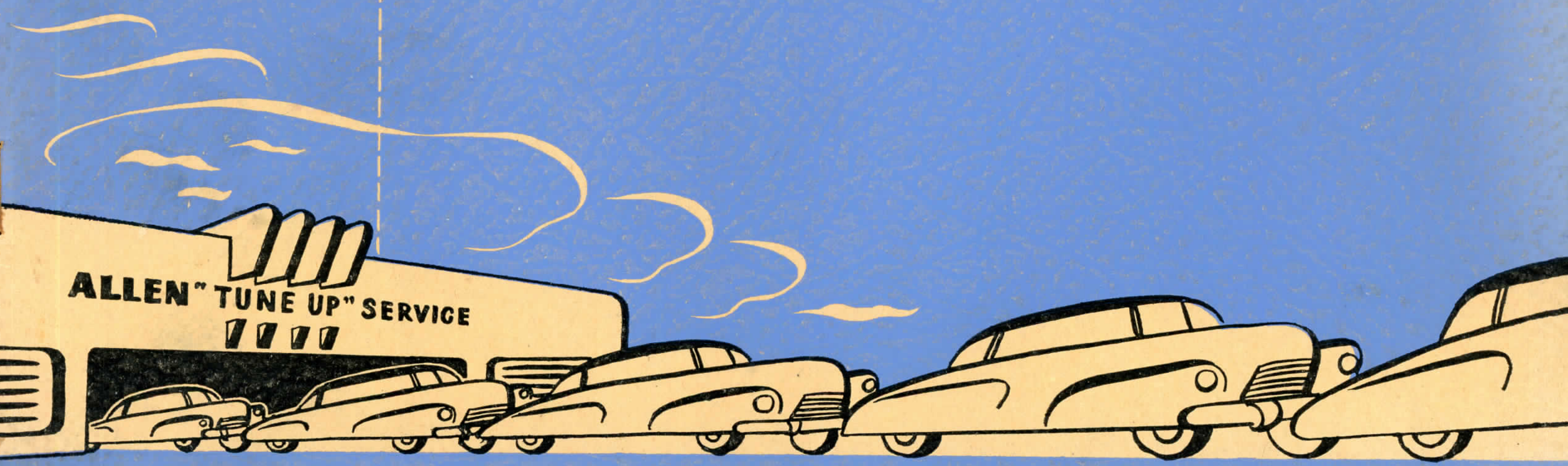
OPERATING INSTRUCTIONS for the

ALLEN

MODEL E-323
POWER TIMING LIGHT

ALLEN EQUIPMENT CORRECTLY OPERATED

MEANS MORE SATISFIED CUSTOMERS



ALLEN ELECTRIC and EQUIPMENT COMPANY • KALAMAZOO, MICHIGAN

PRICE
25 CENTS

OPERATING INSTRUCTIONS
FOR THE
ALLEN E-323
POWER TIMING LIGHT

CONTENTS

SUBJECT **PAGE NO.**

Adjustment for Maximum Power, Performance and Economy ------------ 6
Care and Maintenance ---------------------- 9
General Information ------------------------ 2
Instructions for Ignition Timing ------ 3
Other Uses for Power Timing Light --- 7
Purpose of Power Timing Light --------- 1
Typical Timing Marks -------------- 4 and 5
Writing the Factory ------------------------ 8

PRICE
25¢

ALLEN ELECTRIC AND EQUIPMENT COMPANY
MANUFACTURERS OF TUNE-UP,
BATTERY, ELECTRICAL AND WELDING EQUIPMENT
2101-2117 NORTH PITCHER STREET
KALAMAZOO 13F, MICHIGAN, U. S. A.

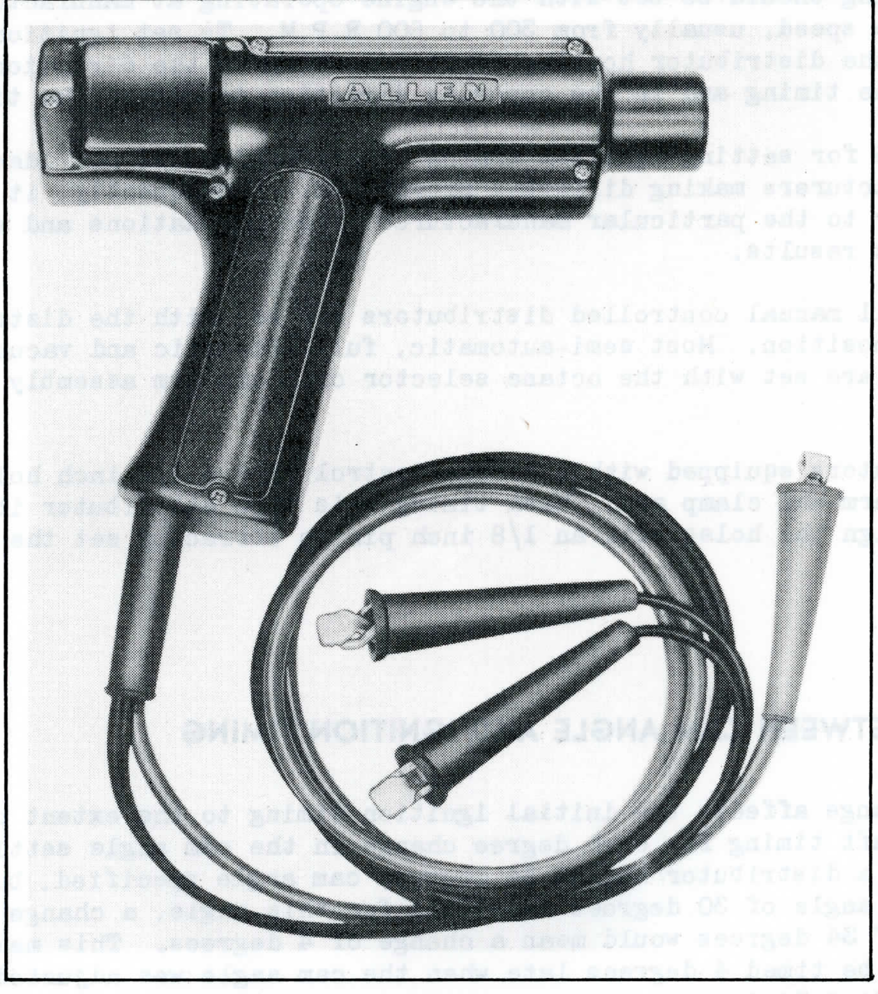
4M11 - 2248 Printed in U.S.A.

THE MODEL E-323 POWER TIMING LIGHT

PURPOSE OF THE POWER TIMING LIGHT

The Allen Model E-323 Power Timing Light operates from the vehicle 6 volt storage battery and employs a built-in power supply, which greatly amplifies the normal flashes obtained from conventional timing lights which operate direct from the the ignition coil. The amplified light is intense enough for setting ignition timing without the necessity of emphasizing the timing marks with white paint or chalk.

The timing light employs the principle of light synchronized with motion, thus enabling the operator to see the fast moving timing marks as stationary for timing the ignition distributor to the engine and checking the overall condition of the automatic spark advance, vacuum spark control, synchronization and general condition of the distributor.



THE MODEL E-323 POWER TIMING LIGHT

FIGURE NO. 1

SETTING THE TIMING

Timing specifications are usually given for No. 1 cylinder, which is the one in front, next to the radiator. When reference is made to left-hand or right-hand as with V-type engines, this applies to that side of the engine when viewed from the driver's seat of the vehicle.

NOTE: - It is important that the Cam Angle is correct BEFORE adjusting the timing, as any change in Cam Angle will also change the ignition timing. On distributors equipped with an octane selector, the selector should be set at zero position at the time of setting the timing.

GENERAL INFORMATION

Most engines are equipped with timing marks and a reference pointer which must line up at the instant the No. 1 cylinder fires. If the timing mark when seen with the timing light is off to either side of the reference pointer, it indicates that the distributor breaker contacts which fire No. 1 spark plug opened too early or too late for the correct ignition timing.

The engine is properly timed when the timing mark and pointer are in line. The timing marks may be found on the flywheel in the form of a marked line or a steel ball embedded in the flywheel. In lieu of flywheel markings some engines have the timing marks located at the front of the engine on the crankshaft impulse neutralizer, damper flywheel or harmonic balancer.

Ignition timing should be set with the engine operating at manufacturer's recommended idle speed, usually from 300 to 600 R.P.M. To set ignition timing, simply turn the distributor housing in its mounting in the direction of rotation to advance the timing and in the opposite direction to retard the timing.

The procedure for setting ignition timing of all engines is not identical; different manufacturers making different provisions. Consequently, it is always best to refer to the particular manufacturer's recommendations and adhere to them for best results.

Generally, all manual controlled distributors are set with the distributor in the advance position. Most semi-automatic, full automatic and vacuum controlled distributors are set with the octane selector or clamp arm assembly at "0" position.

Some distributors equipped with a vacuum control have a 1/8 inch hole in both the advance arm and clamp arm. When timing this type distributor it is necessary to align the holes with an 1/8 inch pin to correctly set the ignition timing.

RELATION BETWEEN CAM ANGLE AND IGNITION TIMING

Cam Angle change affects the initial ignition timing to the extent of one degree crankshaft timing for each degree change in the cam angle setting. For example: With a distributor having 34 degrees cam angle specified, but actually having a cam angle of 30 degrees and timed for this angle, a change to the correct angle of 34 degrees would mean a change of 4 degrees. This means that the engine would be timed 4 degrees late when the cam angle was adjusted correctly to the specified 34 degrees.

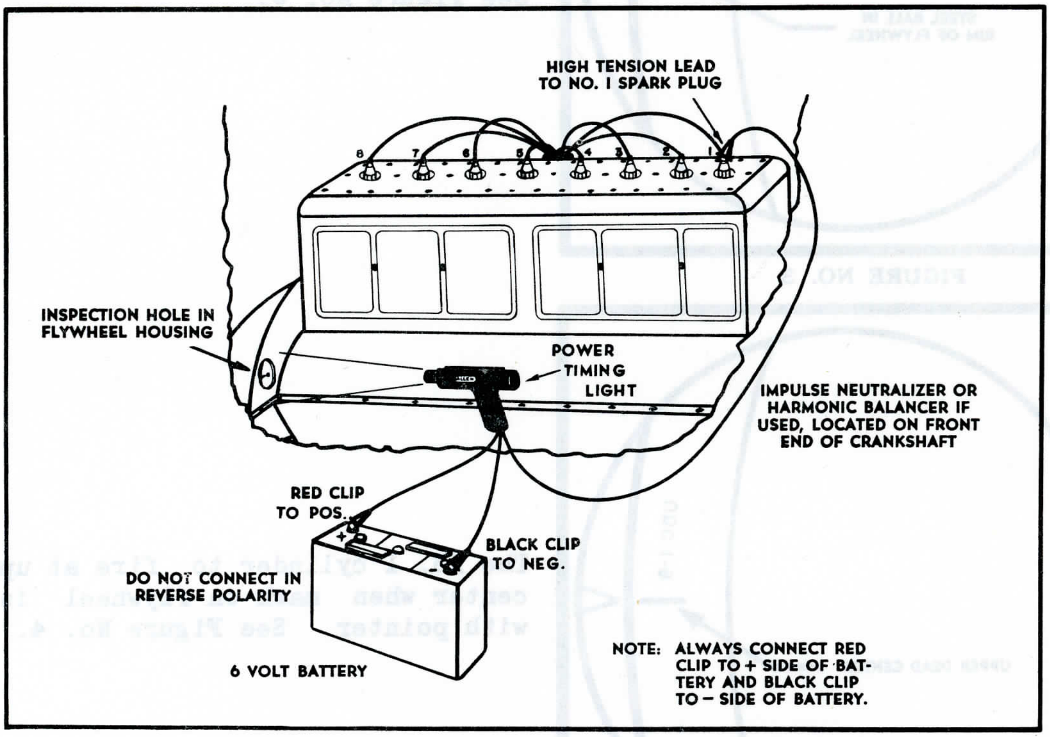
The relation between cam angle and ignition timing can be seen by noting the engine R.P.M. for a fixed throttle setting before changing the cam angle and then noting the change in engine R.P.M. and timing mark.

Because of the change in ignition timing with cam angle change, it is always necessary to re-time the distributor after cam angle has been adjusted. It is important that the Cam Angle is correct when setting ignition timing.

INSTRUCTIONS FOR IGNITION TIMING

CONNECTIONS

1. Connect the RED clip to POSITIVE side of battery. Figure No. 2.
2. Connect the BLACK clip to NEGATIVE side of battery.
   The above connections can be made to any convenient "hot" terminal and ground. Refer to battery ground polarity for proper connections. DO NOT CONNECT IN REVERSE POLARITY.
3. Connect high tension lead from the Timing Light to the No. 1 spark plug, leaving the distributor to spark plug lead attached to the spark plug.


HIGH TENSION LEAD TO NO. I SPARK PLUG
8
7
6
5
4
3
2
1
INSPECTION HOLE IN FLYWHEEL HOUSING
POWER TIMING LIGHT
IMPULSE NEUTRALIZER OR HARMONIC BALANCER IF USED, LOCATED ON FRONT END OF CRANKSHAFT
RED CLIP TO POS.
+
BLACK CLIP TO NEG.
DO NOT CONNECT IN REVERSE POLARITY
6 VOLT BATTERY
NOTE: ALWAYS CONNECT RED CLIP TO + SIDE OF BATTERY AND BLACK CLIP TO − SIDE OF BATTERY.

CONNECTIONS TO POWER TIMING LIGHT
FIGURE NO. 2

PROCEDURE

4. The distributor breaker points should be clean and set to the manufacturer's recommended cam angle. This can be very quickly and easily determined with the Allen Syncrograph or Cam Angle Tester.

5. Operate engine at manufacturer's recommended idle speed, usually from 300 to 600 R.P.M. Engine speed can be measured with the Allen Dwell-Tach Tester.

   Allow the engine to run until normal operating temperature is reached. This is done to assure that the engine operates smoothly and that all automatic carburetor controls have performed their function.

6. Aim the flashes from the Power Timing Light on the timing mark and reference pointer. The timing mark will appear stationary in the flashes of the Light. If the distributor is timed correctly, the timing mark will align with the stationary pointer. If the timing is late, the timing mark will be after the reference pointer in the direction of rotation. If the timing is early, the timing mark will be before the reference pointer.

7. If the timing mark does not align with the pointer, loosen and rotate the distributor in its mounting until mark on flywheel is in line with the pointer.

TYPICAL TIMING MARKS

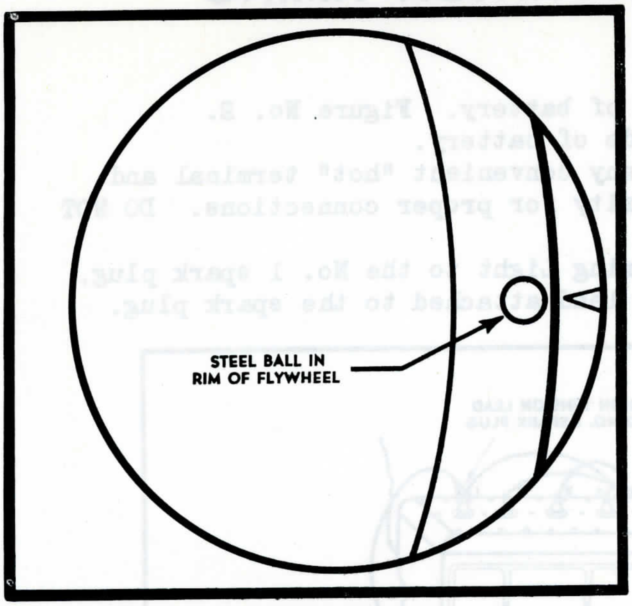


FIGURE NO. 3

The No. cylinder to fire when the steel ball in flywheel is in line with pointer. See Figure No. 3.

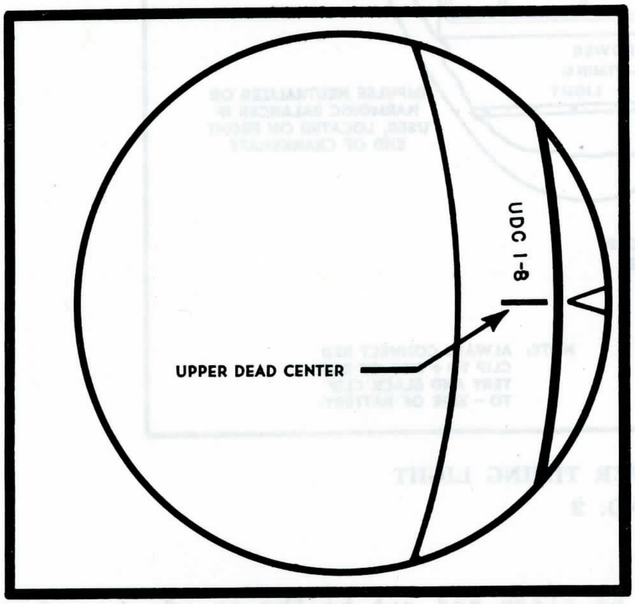


FIGURE NO. 4

The No. 1 cylinder to fire at upper dead center when mark on flywheel is in line with pointer. See Figure No. 4.

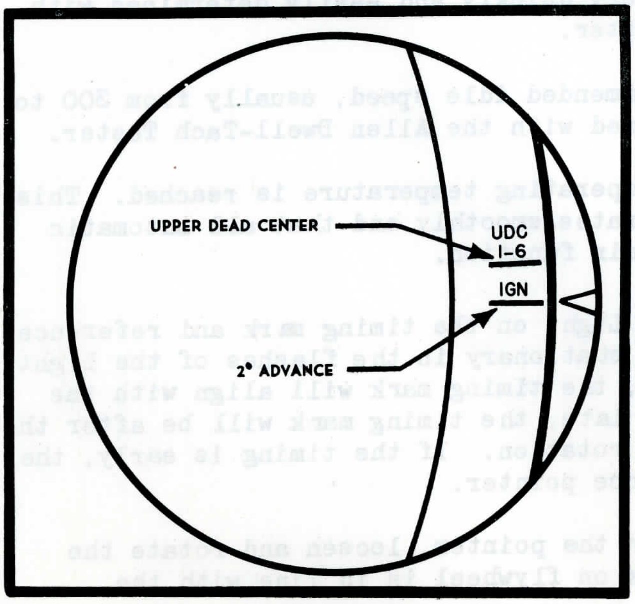


FIGURE NO. 5

The No. 1 cylinder to fire when the "IGN" mark on flywheel is in line with pointer. See Figure No. 5.

TYPICAL TIMING MARKS

The No. 1 cylinder to fire when flywheel mark "IGN. ONE" is in line with pointer. The first mark "IGN. ONE" is 6° before "UDC" and the second mark is 2° before "UDC" allowing a 4° range for variation in cam follower wear, automatic advance and grade of fuel. See Figure No. 6.

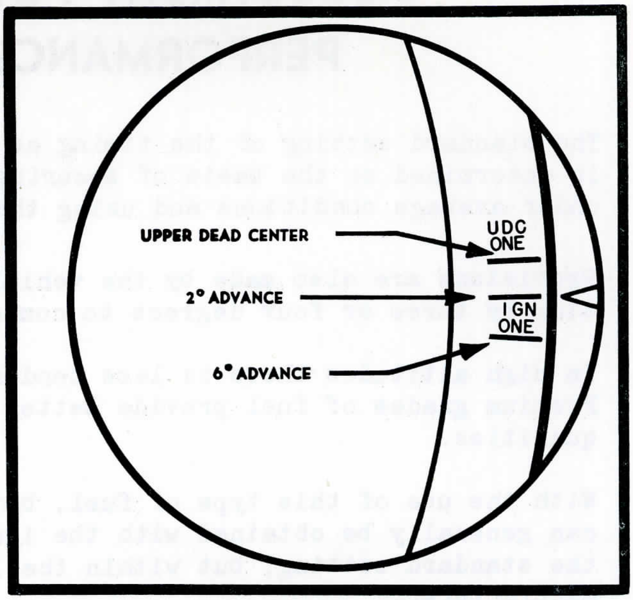


FIGURE NO. 6

The marks on the crankshaft impulse neutralizer represent degrees before and after top dead center. When setting the ignition timing, refer to the manufacturer's specifications and set so corresponding degrees are in line with the pointer. This may vary from "DC" to 7° before "DC" depending upon manufacturer's specifications. See Figure No. 7.

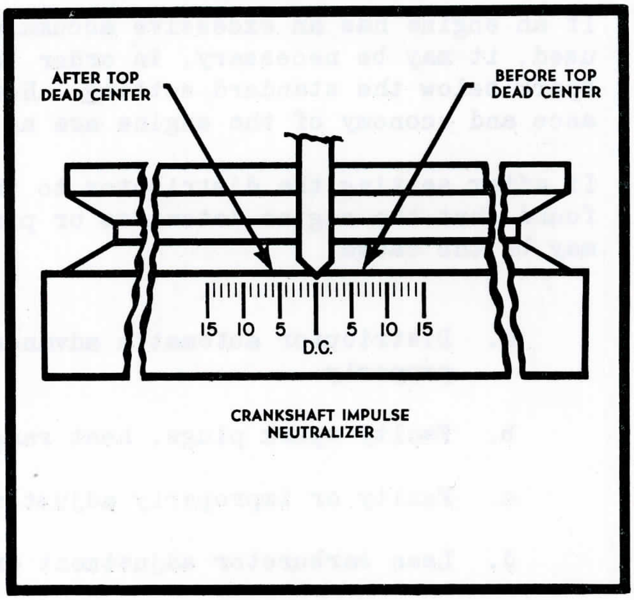


FIGURE NO. 7

The No. 1 cylinder to fire when 1G/A on timing disc is in line with pointer. See Figure No. 8.

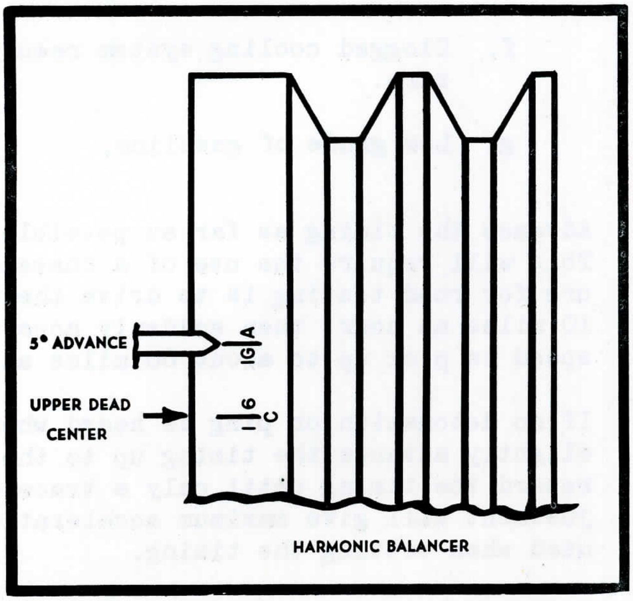


FIGURE NO. 8

ADJUSTMENT FOR MAXIMUM POWER, PERFORMANCE, AND ECONOMY

The standard setting of the timing as recommended by the vehicle manufacturers is determined on the basis of securing maximum power, performance and economy under average conditions and using the type of fuel recommended.

Provisions are also made by the vehicle manufacturers to vary the standard setting by three or four degrees to compensate for certain conditions.

In high altitudes there is less tendency for an engine to detonate or ping. Premium grades of fuel provide better performance and have higher anti-knock qualities.

With the use of this type of fuel, better performance, more power and economy can generally be obtained with the ignition timing advanced slightly ahead of the standard setting, but within the limits generally recommended by the vehicle manufacturer.

If an engine has an excessive accumulation of carbon or a lower grade of fuel is used, it may be necessary, in order to eliminate excessive pinging, to retard the spark below the standard setting. However, if this is done, the power, performance and economy of the engine are no longer at their best.

If after setting the distributor to the timing mark with the Timing Light it is found that the engine detonates or pings, one or more of the following conditions may be the cause.

a. Distributor automatic advance or vacuum control not performing properly.

b. Faulty spark plugs, heat range or gaskets.

c. Faulty or improperly adjusted valve tappets.

d. Lean carburetor adjustment or air leaks at carburetor.

e. Excessive carbon in cylinder head.

f. Clogged cooling system resulting in excessive engine temperature.

g. Low grade of gasoline.

Advance the timing as far as possible up to the point of detonation or ping. This will require the use of a chassis dynamometer or a road test. The procedure for road testing is to drive the vehicle on a level road in high gear at about 10 miles an hour, then suddenly accelerate to wide open throttle, allowing the speed to pick up to about 30 miles an hour.

If no detonation or ping is heard when accelerating from 10 to 30 miles an hour, slightly advance the timing up to the point of slight detonation or ping and then retard the timing until only a trace of the detonation or ping remains. This adjustment will give maximum acceleration, power and mileage for the grade of fuel used when setting the timing.

OTHER USES FOR POWER TIMING LIGHT

INSTRUCTIONS FOR SYNCHRONIZING DOUBLE BREAKERS

1. Time distributor to engine with Timing Light.

2. Remove the Timing Light high tension lead from the No. 1 spark plug and connect it to the spark plug of the cylinder indicated at the second timing mark. The second timing mark is usually indicated as "SYN 2-7" or "IGN 2-7", which indicates that the No. 2 or No. 7 spark plug should fire when the timing mark lines up with the pointer.

3. If the second timing mark is on either side of the pointer, remove the distributor from the engine and adjust the movable breaker assembly so that the points synchronize with the stationary points. This can be easily accomplished on the Allen Syncrograph.

INSTRUCTIONS FOR CHECKING AUTOMATIC ADVANCE FOR FROZEN OR STICKING ADVANCE MECHANISM

1. Time distributor to engine with Timing Light.

2. Direct the Timing Light on the timing mark, and gradually increase engine speed while watching the timing mark. The timing mark should remain stationary until the engine speed is reached at which the automatic advance should start to operate, usually from 500 to 1000 R.P.M.

3. If the timing mark does not move as the engine speed is increased, or if it suddenly releases, the advance mechanism is frozen or sticking in which case the distributor should be removed and replaced or repaired.

INSTRUCTIONS FOR CHECKING DISTRIBUTOR CAM WEAR

1. Time distributor to engine with Timing Light.

2. Remove the Timing Light high tension lead from the No. 1 spark plug and connect it to the No. 6 or No. 8 cylinder spark plug, as indicated by the timing mark "IGN 1-6" or "IGN 1-8". The timing mark should be in line with the pointer.

3. If the timing mark does not line up with the pointer, the distributor cam lobes have excessive wear, in which case the distributor should be removed and replaced or repaired.

VIBRATOR

The power for the lamp is furnished by a built-in power supply which employs a synchronous vibrator. When replacement is necessary, due to erratic operation or failure of the power supply, replace the Vibrator with Mallory Type 45 or Allen Part No. 6709.

WRITING THE FACTORY

Should it be necessary to communicate with the factory, relative to your Power Timing Light, ALWAYS furnish its name, model number and serial number so that prompt and efficient attention can be rendered.

Allen Electric and Equipment Company

Kalamazoo, Michigan, U. S. A.

CARE AND MAINTENANCE OF ELECTRICAL EQUIPMENT

1. DO NOT allow petroleum products, acids or alkalies, to come in contact with painted surfaces or plastic components.

2. Use a clean soft cloth for a DAILY dust cloth.

3. PLASTIC PANELS, LEADS AND SOCKS should be cleaned with MILD SOAP AND WATER.

4. SMALL SCRATCHES can sometimes be removed from plastic with rouge.

5. CORRODED TERMINALS can be cleaned with a solution of baking soda and water.

6. HEAT, generated in leads and clips, which becomes more than warm to the touch is a result of a poor connection and will result in an extra load being placed on the unit.

7. LARGE ranges have been placed on meters for heavy loads, SMALL ranges for finer reading. Always select the range large enough for the job, or damage will result.

8. IN MAKING ELECTRICAL CONNECTIONS, always watch the meter when you cause the current to flow; don't overload the meter. Use the proper shunt.

9. MOISTURE is second only to grease-and-dirt in shortening the life of electrical equipment. One of the less obvious ways in which moisture can damage equipment is to store in a non-heated area. Moisture can cause meters to stick, transformers to short, insulation and condensers to deteriorate.

10. METERS REQUIRING A POWER SUPPLY. A.C. or D.C. current may be required. It may be of a high or low voltage. Exercise caution in connection units to proper voltage source.

11. POWER TIMING LAMP. Its life will be greatly lengthened if disconnected when not in use.

12. POLARITY. Care should be exercised to see that units are not connected in reverse polarity.

13. In most cases, when units have been subjected to materials used in fire extinguishers, they may be considered beyond repair in making insurance adjustment.

14. SIX VOLT PLUG-IN RECEPTACLE UNITS will work better after a small amount of powdered graphite has been applied.

15. FANS. Units having a fan for cooling purposes cannot function well if covered, as air flow is restricted.

16. METERS exposed to the sun's rays for long periods of time will fade.

17. GROWLERS should not be turned "ON" unless first an armature has been placed into position to test.

18. UNITS USING FLASHLIGHT BATTERIES should be turned to the "OFF" position when not in use. When the batteries become discharged they should be removed at once, or damage will result.

19. IN EACH INSTANCE, REFER TO THE INSTRUCTION MANUAL BEFORE ATTEMPTING TO OPERATE. MINOR CHANGES HAVE SOMETIMES BEEN MADE, AND NEW MODELS MAY OPERATE DIFFERENTLY THAN PREVIOUS ONES.

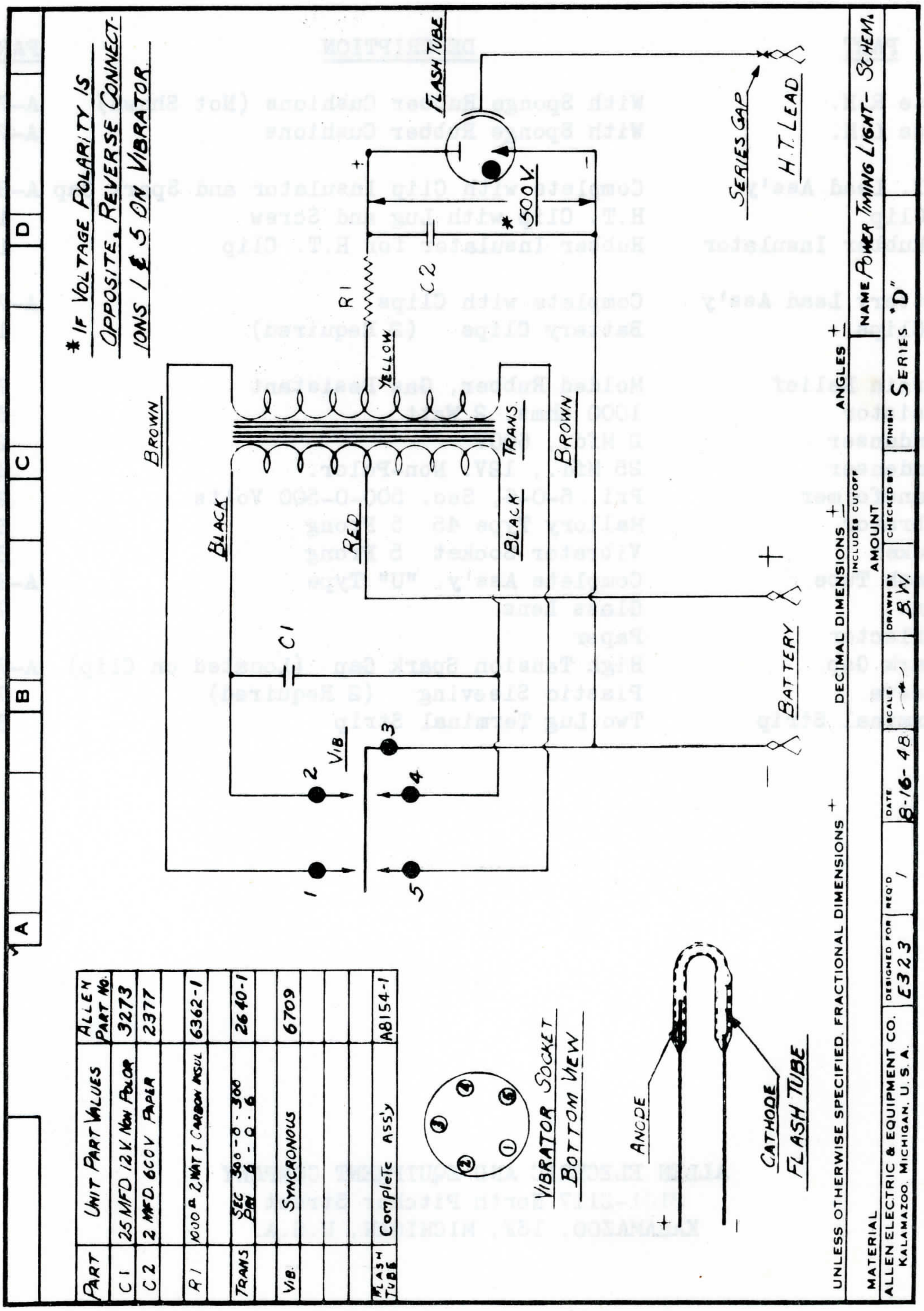
ALLEN ELECTRIC AND EQUIPMENT COMPANY
2101 N. PITCHER STREET KALAMAZOO, MICHIGAN, U. S. A.
FORM NO. 503 PRINTED IN U.S.A.

E-323
9-30-48

ALLEN ELECTRIC AND EQUIPMENT CO.

E-323 POWER TIMING LIGHT REPLACEMENT PARTS LIST AND SCHEMATIC CIRCUIT DIAGRAM

FOR MODELS STAMPED SERIES "D"



PART	UNIT PART VALUES	ALLEN PART NO.
C1	25 MFD 12V. Non Polor	3273
C2	2 MFD. 600V Paper	2377
R1	1000 Ω 2 WATT Carbon Insul	6362-1
TRANS	SEC 500-0-500 PRI 6-0-6	2640-1
VIB.	SYNCRONOUS	6709
FLASH TUBE	Complete Ass'y	A8154-1

ALLEN ELECTRIC AND EQUIPMENT CO.
2101 N. PITCHER ST. KALAMAZOO, MICHIGAN, U. S. A.

ALLEN ELECTRIC AND EQUIPMENT COMPANY

E-323 POWER TIMING LIGHT REPLACEMENT PARTS LIST

FOR MODELS STAMPED SERIES "D"

KEY	PART	DESCRIPTION	PART NO.
1	Case R.H.	With Sponge Rubber Cushions (Not Shown)	A-7693-1
2	Case L.H.	With Sponge Rubber Cushions	A-7694-1
3	H.T. Lead Ass'y.	Complete with Clip Insulator and Spark Gap	A-8167
4	Clip	H.T. Clip with Lug and Screw	1221
5	Rubber Insulator	Rubber Insulator for H.T. Clip	1187
6	Battery Lead Ass'y	Complete with Clips	A-7676-1
7	Clips	Battery Clips (2 Required)	1220
8	Strain Relief	Molded Rubber, Gas Resistant	7672
9	Resistor	1000 ohms, 2 Watt	6362-1
10	Condenser	2 Mfd., 600V	2377
11	Condenser	25 Mfd., 12V. Non-Polor.	3273
12	Transformer	Pri. 6-0-6, Sec. 500-0-500 Volts	2640-1
13	Vibrator	Mallory Type 45 5 Prong	6709
14	Socket	Vibrator Socket 5 Prong	6659-2
15	Flash Tube	Complete Ass'y. "U" Type	A-8154-1
16	Lens	Glass Lens	7674
17	Reflector	Paper	
18	Spark Gap	High Tension Spark Gap (Located on Clip)	A-7687-2
19	Sleeve	Plastic Sleeving (2 Required)	7691
20	Terminal Strip	Two Lug Terminal Strip	6889

ALLEN ELECTRIC AND EQUIPMENT COMPANY
2101-2117 North Pitcher Street
KALAMAZOO, 13F, MICHIGAN, U.S.A.

File in Allen Service Handbook

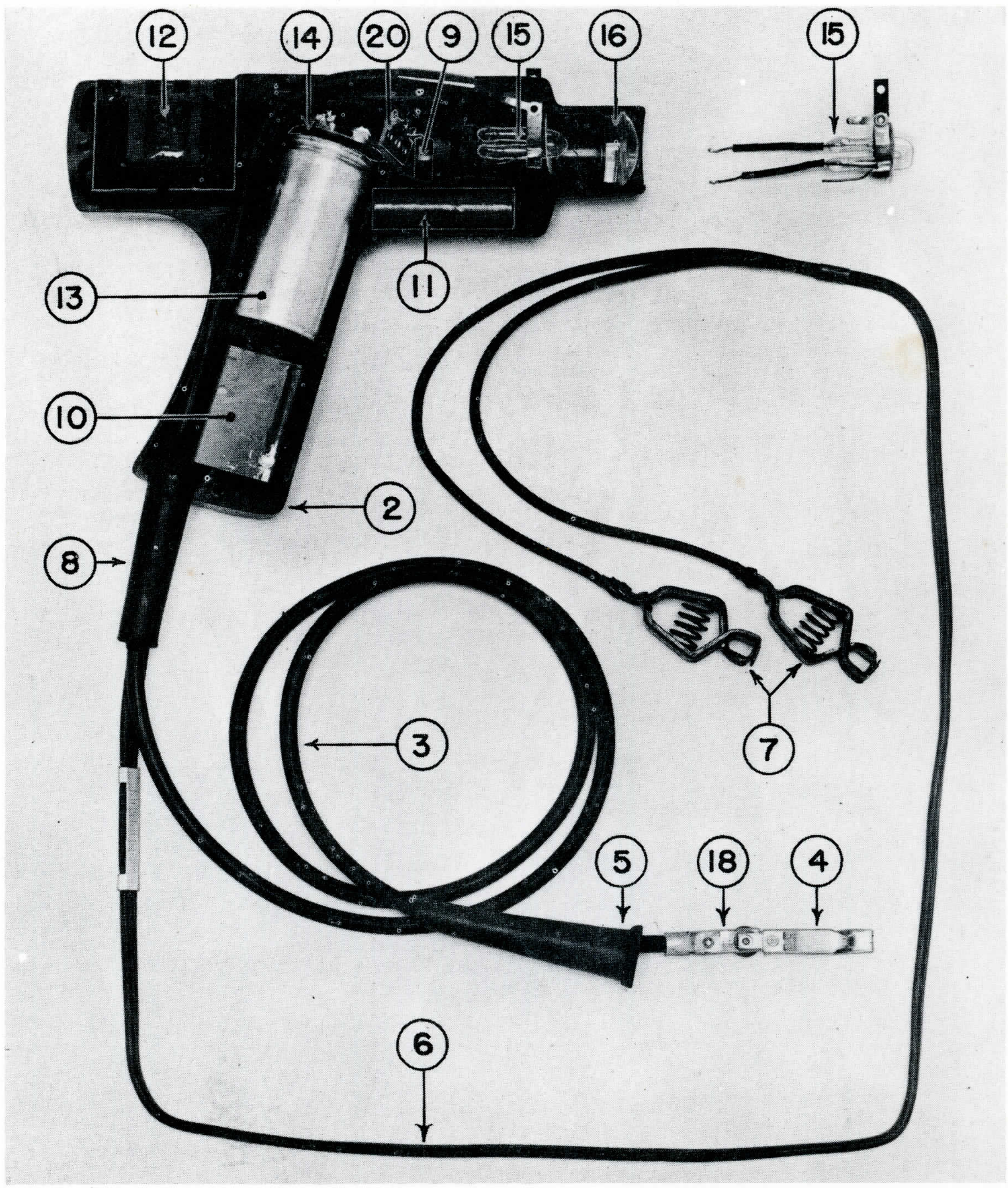
E-323
9-30-48

ALLEN ELECTRIC AND EQUIPMENT CO.

E-323 POWER TIMING LIGHT

PARTS LOCATION PHOTOGRAPH

FOR MODELS STAMPED SERIES "D"



ALLEN ELECTRIC AND EQUIPMENT CO.

2101 N. PITCHER ST.   KALAMAZOO, MICHIGAN, U. S. A.

PRINTED
IN
U.S.A.